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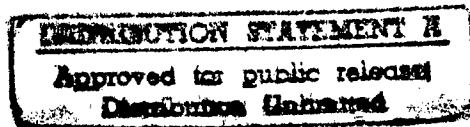
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# The Three to Six Second Advantage: Tank Combat in Restricted Terrain

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*"Terrain is not neutral - it either helps or hinders each of the opposed forces. Commanders must develop an eye for terrain; they must recognize its limitations and possibilities for protecting friendly forces and putting the enemy at a disadvantage. Successful commanders understand terrain and how it affects operations. They are able to grasp the potential capabilities and limitations of the space in which they operate."<sup>1</sup>*

U.S. Army tank crew training, tactics, techniques, and procedures (TTP) and doctrinal manuals focus on open terrain. Tank crew training, from UCOFT to CALFEXes,<sup>2</sup> is specifically designed for open terrain. Many potential battlefields, however, are located in areas with mountainous terrain. Many of our potential enemies--primarily Second Wave<sup>3</sup> military forces--will leverage the terrain to make up for their training and technological disadvantages. A war in Korea, or in the Balkans, will find the enemy using infantry and second-generation tank and antitank weapon systems to ambush American tankers in restricted terrain.

If the U.S. Army fights in restricted terrain, force protection will be a major issue. Tanks and mechanized infantry provide a force with mobility, firepower, and enhanced protection; however, there is never enough dismounted infantry or artillery. In restricted terrain, an armored combined arms force is the weapon of choice for quick, decisive victory that produces a minimum of friendly casualties. Our Abrams tank supplies this with its excellent armor protection, mobility, and tough, battle-winning platform.

Commanding a tank in restricted terrain is much more demanding than in open terrain. In restricted terrain, a smart enemy in concealed positions will use the folds in the ground to ambush the attacking tanks at point-blank ranges. To defeat the ambusher, tank crews must wrest the initiative from the defender and fire first. This is a very challenging task. This challenge was dramatically evident during the Korean War (1950-1953), when superb tankers demonstrated "on numerous occasions that they could operate effectively in terrain that doctrinally was considered completely unsuitable for tanks."<sup>4</sup>

Tank commanding in restricted terrain, therefore, requires superb tank commanders with highly trained crews. Superb tank commanders use skill and enhanced battlefield situation awareness to gain a decisive time advantage to win in the defile - a "three-to-six second advantage." The three-to-six-second advantage is the ability to fire on an enemy ambusher at close range, in a defile, before he fires at you.<sup>5</sup> To gain this advantage, the tank commander must build a high performing tank crew, master the critical crew tasks, and perform training that prepares the crew to win the close-range, direct-fire fight.

## Build a High Performing Crew

In the past, most tank crewmen performed single-skill tasks. The driver drove. The loader loaded. The gunner aimed the gun. Only the tank commander had to master multiple-skill tasks. The tank commander was expected to acquire the target, guide the tank, talk on the radio, and decide how to fight the tank. This delegation of tasks works well in open terrain, where the tank commander has more time to react to enemy threats, and when the engagement ranges allowed more time to acquire, designate, and destroy targets.

In restricted terrain, a tank commander has less time to react to enemy actions. To react successfully under these conditions, the tank crew must share some of the multiple skill tasks that were once the sole role of the tank commander. This requires tank crewmen who know much more about fighting the tank as a whole. It requires a team that can anticipate the enemy's moves.

The tank commander is responsible for training his crew in these multiple skill tasks. To develop the crew into a high-performing team, every crewmember must work together to accomplish the common goal.<sup>6</sup> The tank commander must build two high-performing teams: the tank commander/gunner team and the tank crew team.<sup>7</sup> As a team builder, the tank commander must teach his crew. He is responsible for the crew and teaches them how to operate the tank as a team. The goal of this training is to create a high performing team where each crewmember is a part of mission success. The exchange of information in the tank resembles the actions of a pilot, co-pilot, navigator, and bombardier of an attack bomber.<sup>8</sup>

Not every tank commander will have the skill or the experience to build a high performing tank crew. Platoon sergeants, company master gunners, platoon leaders, and company commanders must reinforce the training effort by mentoring weak tank commanders in multiple-task skills. There are as many methods to produce high performing tank crews as there are combat situations. The key is to address the issue and plan to grow crews that can function as more than the sum of their parts.

The multiple-task skills of the tank crew fighting in restrictive terrain center on battlefield situational awareness. The situational awareness of the tank crew in restrictive terrain combat must occur faster than in open terrain combat. Effective weapons employment is a crew task that requires a high degree of interaction and drill. Each member of the crew - loader, driver, gunner, and tank commander--apply a collective battlefield situation awareness to employ the tank's firepower on the close-range engagements typical of fighting in restricted terrain.

The driver must be more than a passive extension of the tank's movement; he must master the battlespace to the tank's front. To accomplish this, the driver must know where he is going and know how to get there. The driver must be trained to use a route chart effectively and efficiently.<sup>9</sup>

The loader's tasks involve scanning, reporting position location, employing the loader's machine gun and, finally, loading the main gun. When traveling, the loader must be trained to constantly cover his crew search sector of responsibility,<sup>10</sup> while at the same time keeping track of the vehicle's exact position using a global positioning satellite receiver device (PLGR or SLGR).

The gunner, while primarily responsible for identifying, engaging, and destroying enemy elements with the main gun and coaxial machine gun, must continually keep the tank commander abreast of the fire control system status. This includes manually indexing battlesight ranges (to be discussed in depth later), tracking ammunition expenditures, creating sketch cards, etc. Equally important, the gunner must maintain a high state of situational awareness, for he is the coupling between the tank commander and the fire control system. This requires him to maintain positive control of his orientation on the battlefield and, therefore, the gun tube orientation. His ability to track the vehicle's progress keeps the main gun oriented effectively to gain an advantage. This translates to going to a gun fight with your weapon already drawn and, for the most part, accurately aimed and armed.

The tank commander must master situational awareness. His ability to see, anticipate, and react to expected enemy situations is decisive. Anticipating the keyhole shot requires an acute understanding of the ground and effective map reconnaissance. The tank commander must be a technical expert in his navigational abilities - map reading, PLGR use, terrain association on the move, and terrain interpretation. Terrain interpretation develops the possible ambush site, keyhole position, intervisibility line, or kill sack without a visual reconnaissance of the area. The tank commander primes the crew for success by clearly relating checkpoints, phase lines, likely enemy keyhole positions, engagement areas, and the axis of advance/route. From these interpretations, a picture of the possible keyhole positions can be clearly made. He must inform the crew, prior to movement, of areas of interest, suspected enemy locations, difficult maneuver sites, restricted areas, and expected engagement areas. Guided by the tank commander, the driver, loader, and gunner are fused into a team that maximizes information concerning

commander, the driver, loader, and gunner are fused into a team that maximizes information concerning the tank's battlespace.

The quality of the tank crew is, in large measure, dependent on the tank commander. The tank commander must not only be in command of his vehicle but must also command the situation. His leadership, skill, determination, and drive are the linchpins for gaining the three-to-six second advantage. Training focused on techniques for winning in restricted terrain must be arduous, realistic, demanding, and conducted at a frequency that will achieve a 3-6 second advantage over the defender in the defile fight.

## The Crew's Critical Tasks

*FM 17-12-1-1, Tank Gunnery*, establishes that Abrams Tank Crews must have "a thorough knowledge of their tank's functional capabilities, the techniques of acquiring targets, and the effective use of all crew-served weapons. In addition, U.S. tank crews must develop and sustain tactical crew skills that will allow them to maneuver effectively and survive on the battlefield."<sup>11</sup> Speed and accuracy of engagements depend on crew proficiency in the critical tasks listed below:

**Acquire Targets in Restricted Terrain:** Target acquisition is the critical crew task in restricted terrain combat.<sup>12</sup> Short engagement ranges make target acquisition the single most critical factor in gaining the three-to-six second advantage. Target acquisition is the timely detection, location, and identification of targets in sufficient detail to permit accurate attack by either direct fire or supporting fire. The entire crew must practice search techniques from their crew positions: rapid scan, slow scan, and detailed search.

Collectively, the crew must master target acquisition.<sup>13</sup> The crew must instinctively perform all elements of the target acquisition process to achieve the three-to-six-second advantage. The target acquisition process has six essential progressive and interdependent steps: crew search, detection, location, identification, classification, and confirmation, all of which must be mastered by each member of the crew.<sup>14</sup>

Crew search, or observation, is the act of carefully viewing or watching the area of operations, using search and scan techniques and sectors of observation, to acquire targets. Each crewman must be responsible for his assigned area of observation and be able to perform all types of visual searches. The crew must master the rapid scan, slow scan, and detailed search techniques.

Detection of objects with potential military significance on the battlefield is an important way to get an edge in a defile fight. The crews must master the ability to identify the current or recent presence of vehicles or personnel by the telltale indicators or clues left by the enemy. These clues include empty foxholes, hot spots, recent fires, track marks on the ground, dust clouds, exhaust smoke, ATGM residue, loose or disturbed dirt, etc. The crew's awareness of these items will alert them to battlefield hazards (ambush, obstacles) or enemy emplacements.

The crew must be able to locate the potential enemy by looking and listening. The crews must be highly skilled at putting the weapon systems to bear against the suspected enemy location using the TC override, traverse method, reference point method, clock method, sector method, or EA system method (to be detailed later).

The tank crew must be able to identify the vehicle or position as friend or foe, rapidly and correctly,<sup>15</sup> and subsequently classify the target as most dangerous, dangerous, or least dangerous. The most dangerous is the threat vehicle that has the ability to kill you, and is preparing to do so; the dangerous threat is one that has the ability to kill you, but for whatever reason is not prepared to engage; the least dangerous is the threat that does not possess the ability to kill you, but has the means to call someone who can. Once complete, the tank commander must confirm the target for destruction as a threat and most dangerous of the present threat vehicles.

In restricted terrain, a smart enemy defends the defile against an armored penetration by reinforcing his

In restricted terrain, a smart enemy defends the defile against an armored penetration by reinforcing his defense with the terrain. Keyhole positions anchor his defense. A keyhole position is a defensive position that allows for single or multiple flank or rear shots at the enemy during limited windows of opportunity, without directly giving away the firing position. It is as if the enemy was firing at you through a keyhole as you passed down a hallway. Keyhole positions are typically found in defiles.

Each member of the crew, not just the tank commander, works as part of a team to anticipate and identify enemy keyhole positions. Once anticipated, the crew prepares to engage and destroy the enemy, orienting the main gun in the direction of the anticipated keyhole position. Gun tube orientation is instrumental in gaining the three-to-six second advantage. If the situation permits, the tank should advance and execute reconnaissance by fire,<sup>16</sup> using 7.62-mm machine guns and .50-caliber machine guns to suppress the keyhole shot with fire as the tank approaches.

**Graphics and Overlays:** The crew must have a basic, thorough understanding of all common graphics used by their unit and their SOP. The primary training references for this are FM 17-15, Oct. 1987, Chapter 2, and FM 101-5-1, Chapter 2. Each crewman must have the ability to interpret all graphics given to the tank commander and understand their meaning and correlation to the mission. Understanding military graphics and overlays is a fundamental factor in situational awareness and mission accomplishment.

**PLGR (AN/PSN-11, Precision Lightweight Global Positioning System Receiver):** Each member of the crew should master the PLGR. The PLGR gives each tank crew the ability to determine an accurate 10-digit grid coordinate, check time, rate of movement, direction of movement, and navigational waypoints. The ability of each crewman to use this equipment accurately and efficiently directly correlates to battlefield situational awareness.

To keep the number of tasks per crewman manageable, the PLGR should be located in the loader's position. The loader must be trained to plot way points, track movement, locate current position, and update the PLGR as the tank commander demands. Once the loader has mastered this, the tank commander can receive updates without losing his situational awareness through the defile, on the road march, or when maneuvering cross country. Simply put, this time-saving measure allows the tank commander freedom to concentrate on the movement of his vehicle, tracking the map with the terrain, and the rapid employment of his direct fires from all weapon systems. It helps the crew to perform quickly as a team.

The placement of the PLGR in the loader's position, to the right of the AM-1780 VRC, allows for easy access and allows the crew to go into protective posture quickly. The external antenna cable should be run through the turret to allow for this.<sup>17</sup> With this ability, information can quickly get to the tank commander, gunner, and driver via intercom to provide an accurate assessment of the tank's location and direction of travel.

**Route Chart:** This is a navigational aid to the tank commander, and is used by the driver, gunner, and tank commander. The route chart is a sketch card of the area he will be traveling through, along with key points such as terrain features, man-made objects, grid lines, engagement areas, and cardinal directions. The route chart must list all critical checkpoints and phase lines as outlined during the troop-leading procedures following the OPORD.

Through a thorough map reconnaissance, and using the graphics issued from the OPORD and the driver's odometer, the driver maintains his situational awareness through all phases of the operation using the route chart.<sup>18</sup> The route chart (see FM 17-15, p. 2-38) breaks up the route or operation into legs or segments, each with a unique direction or distance. Each leg includes major terrain features, and manmade objects or other identifiable features along the route to aid in determining current location. The curve line distance of each leg is measured to the nearest 100 meters. The route chart will also contain the general azimuth of each leg of the operation. The loader - utilizing the PLGR - will keep the driver up to date on all changes. The driver will use the odometer to keep track of the distance traveled on a particular segment of the route. The driver reviews the written description of the route to help prevent navigational errors. The driver should announce these occasions/locations to the crew, identifying them through use of his odometer as necessary to continually keep the crew informed of their progression. As

through use of his odometer as necessary to continually keep the crew informed of their progression. As the loader announces way points (check points and phase lines), the driver can verify the vehicle's current location and direction of travel from his route chart and can anticipate the tank entering impending engagement areas. Without this knowledge from the loader, the driver's orientation is degraded, and he cannot actively anticipate the evolving situation. These events, such as entering engagement areas or the center battle area of a defile, key the driver to identify hull down positions, covered routes, alternate positions and other tactical areas of interest. The gunner should also have a route card with similar information to enhance his battlefield situation awareness and tactical orientation.

**Battlecarry:** Most Threat armies have purchased Russian manufactured armored personnel carriers [APCs], tanks, and artillery.<sup>19</sup> At close range, all current Threat tanks and APCs can be destroyed with a 120-mm High Explosive Antitank (HEAT) round. Utilizing the Sabot round in the defile, where vehicles will typically be in column, places lead vehicles in danger of being struck with discarding components. These sabot pedals separating from the penetrator may cause injury to friendly soldiers or damage friendly vehicles. At close range, faced with split-second target identification, the HEAT round is the round of choice. It is also the preferred round against bunkers and antitank positions. The commander must make a conscious decision to employ HEAT as his element's battlecarry ammunition.

**Battlesight Ranges:** When fighting in the defile, engagement ranges may be anywhere from 25 meters to 1000 meters. This makes it difficult for the crew to fight the tank when the tank to target range is less than 200 meters.<sup>20</sup> A common occurrence is that the target is so close, the computer cannot determine an accurate ballistic solution, causing confusion in the turret. Using METT-T, the commander should determine defile battlesight ranges.<sup>21</sup> Currently, most armored units use 900 meters for HEAT and 500 meters for the coax machine gun (7.62mm, M240) battlesight ranges. During the defile fight, when ranges to targets may be as close as 25 meters, these standard ranges may cause the crew to miss the target using battlesight techniques currently in SOP.<sup>22</sup> A specific battlesight range for the defile fight should be used by the tank commander upon entering a defile. This range for HEAT-MP-T, for instance, should be 400 meters.<sup>23</sup> Another range must be determined for coax. For instance, a battlesight range of 300 meters allows a crew to engage troop and troop like targets accurately from 25 to 400 meters.<sup>24</sup> These defile battlesight ranges are significant additions to the crews' gunnery techniques and require practice to integrate into their tactical operations. These battlesight range changes will be directed by the tank commander upon entering the defile identified by the loader, the driver, and the tank commander's collective situational awareness.

Indexing the defile-specific battlesight range is simple. The tank commander tells the gunner to index the defile battlesight ranges (HEAT and coax) when the vehicle is nearing a defile determined during the map recon with the operational graphics. The crew works as a team to check and re-check current position and upcoming named areas of interest such as engagement areas or defiles:

"We just passed Check Point 4," says the loader over the intercom.

"Hey, then we should be entering EA Colorado in 300 meters," the driver says.

"OK, gunner, Colorado is a narrow defile, index defile battlesight ranges! Loader, let me know when we hit Check Point 5," commands SSG Tanksley.

"Ranges indexed, HEAT indexed, main gun armed, give me battlesight," CPL Gunn replies.

"WILCO," says the TC as he depresses the battlesight button. "Dump your trash," he says, telling the gunner to dump his lead.

"Check Point 5 in 100 meters!" The loader scans his crew search sector, checks the waypoint, and announces direction of travel to the crew: "Azimuth 046 degrees, Northeast."

Collectively, the crew should be working together, aided by a shared situational awareness. This will get smoother with training and repetition. The example above reflects actions in the tank while on the move. It occurs prior to entering the defile, and only shows a portion of what has been already been covered in

It occurs prior to entering the defile, and only shows a portion of what has been already been covered in this article. The second phase of training for the defile fight applies all the individual and crew critical tasks through mounted training.

**Lay the Main Gun:** The tank commander must master the ability to accurately and instinctively place the gunner on target (or anticipated keyhole position) using the override, and ensure smooth transition back to the gunner's control. This is clearly a critical skill when focusing on the three-to-six second advantage. The three-to-six-second-advantage is based upon the approximate time it takes for the enemy to identify you as the target, lay his weapon on you, and fire. A basic rule of armored combat is that the first to fire is the first to kill. The three-to-six-second-advantage is, literally then, a matter of life and death. The words of Field Marshal Erwin Rommel concerning this issue are as true today as they were in WWII: "the day goes to the side that is the first to plaster its opponents with fire. The man who lies low and awaits developments usually comes off second best."<sup>25</sup>

When fighting the defile fight, firing first is a decisive advantage to the attacking tank, section, platoon, and company. If the lead tank is destroyed or disabled, and the defile blocked, an entire task force attack can be slowed or stopped. The smooth transition of control from TC to gunner includes having the 3X reticle encompassing the target or the area of interest. This task, although part of the Tank Crew Gunnery Skills Test (TCGST),<sup>26</sup> must happen within two seconds, on the move, rather than six seconds stationary. At the same time, the tank commander must execute a "Battlesight Drill," where he indexes the battlesight range using the MANUAL RANGE BATTLE SIGHT button once he releases control of the override. The speed at which he does this allows the gunner the maximum time to engage and destroy the target or anticipated target.

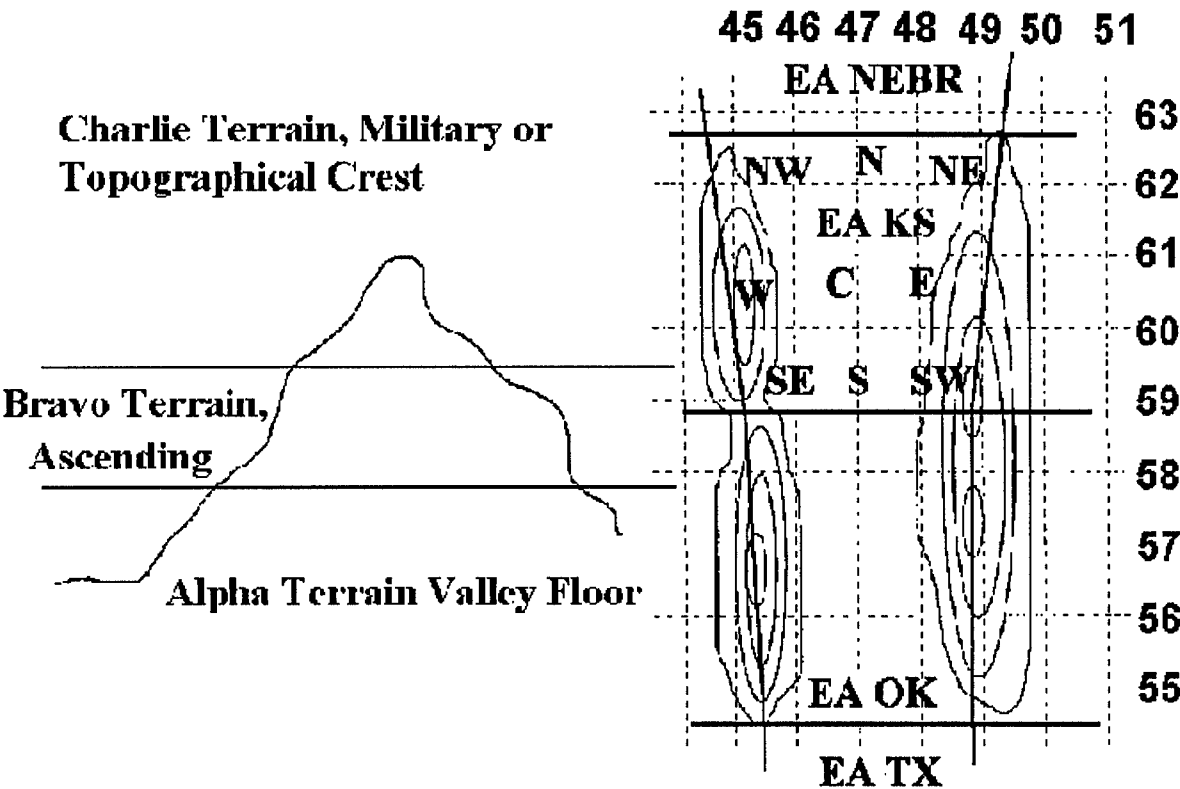
**Fighting in 3X vs. 10X:** When fighting the defile and other types of restricted terrain, it is not uncommon to engage targets at ranges far less than normal battlesight ranges. Because of this, the gunner must be able to engage targets in three power (3X) using day (GPS) or thermal (TIS) channels. Although this is never used in open terrain, it saves critical time in restricted terrain. The gunner must be fully capable of engaging targets at extremely close range without moving to 10X. This allows the gunner to scan further in azimuth and elevation, find the targets, and kill them when the targets are between 25 meters and 400 meters. When engaging troop or troop-like targets at ranges between 25 and 400 meters, the gunner, firing in 3X, has the agility to observe burst on target, destroy a target, identify a subsequent target, observe burst on target, and adjust to another troop target without moving back and forth between power selections. His ability to engage in this manner is a critical task.

In 3X, the gunner could easily identify and engage all troop targets while tracking others in the area. This also holds true for enemy light armor. The gunner will be able to easily identify the enemy light armor in 3X at ranges out to 400 meters and, also in 3X, engage and destroy the same. The target will appear large enough in the 3X sight picture in TIS and the GPS day channel at ranges less than 400 meters to lay with killing precision. If the target is at a greater distance, the gunner can instinctively move to 10X, lase, and blaze.

**Recon by Fire:** To conserve main gun ammunition, tank machine guns should be used for reconnaissance by fire to cause a hidden enemy in a keyhole position to react. The loader or gunner should fire a single burst from their M240 machine guns (20 to 30 rounds) while constantly observing for enemy movement, enemy return fire, or the flash of rounds striking metal. The gunner should conduct his recon by fire in 3X, allowing him further scanning of the suspected enemy emplacement. The tank commander should not perform recon by fire with the caliber .50 unless absolutely necessary. When loaded for combat, the caliber .50 has only 100 rounds readily available, and the rounds are typically Armor Piercing Incendiary with Tracer (API-T). These rounds create a flash that could be mistaken for the rounds striking a threat vehicle, and cause the unnecessary expenditure of a main gun round.

Reconnaissance by fire is used when other means of enemy detection have been unsuccessful or are not available. It is best employed with tanks in section. One tank can fire on a suspected enemy position or suspicious area to cause the enemy to react and compromise his position at the time of our choosing, not his.<sup>27</sup> The second tank can then engage and destroy the enemy from a different location. Each crew must be prepared to perform this critical task with their vehicle alone, or in tandem with their wingman.

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## Engagement Area System

**Engagement Area System:** An engagement area is an area in which the commander intends to trap and destroy an enemy force with the massed fires of all available weapons. Engagement areas are routinely identified by a target reference point in the center of the trap area, or by prominent terrain features around the area. Although engagement areas may also be divided into sectors of fire, it is important to understand that enemy defensive systems will focus on avenues of approach. Engagement areas and sectors of fire are not intended to restrict fires or cause operations to become static or fixed; they are used only as a tool to mass fires.<sup>28</sup>

Engagement areas offer unique control opportunities in offensive and defensive fighting in restrictive terrain. The nature of restrictive terrain lends itself to designation by quadrant. The quadrant method of fire control is the most suitable and easily understood of the many engagement area systems for fire control in narrow defiles.

Most defiles can naturally be divided into quadrants based on intervisibility lines. Generally, these intervisibility lines can be identified during the map reconnaissance. Designating these portions of compartmentalized terrain as engagement areas breaks the battle into bite-sized chunks. Using engagement areas that are 1-3 kilometers long, this system employs cardinal directions as floating Target Reference Points (TRPs). These floating TRPs offer more precision to pass information to follow-on forces than the direction of travel or clock methods. For a tank commander to continually identify TRPs while on the offense is increasingly more complex as the mission continues. A successfully tested EA system uses cardinal directions as "floating" Target Reference Points. This method breaks down the engagement area into nine (9) sub-areas, much like a tic-tac-toe board, subsequently named after their cardinal direction [north, northeast, east, southeast, etc.] and "center," respectively.



cardinal direction [north, northeast, east, southeast, etc.] and "center," respectively.

In addition, the altitude of the terrain is designated. Each mountain or hill is explained as either ALPHA [valley], BRAVO [ascending terrain], or CHARLIE [military crest to topographical crest] terrain.

This EA technique is exactly suited for controlling direct fires in a defile. Phase lines outlining each engagement area are designated along visible portions of compartmentalized terrain. This helps the tank crew understand the mission, relate the actions to acquisition reports from other vehicles, and apply immediate and accurate target acquisition and massing of fires. Speed and accuracy of reporting improves with practice. An example of a standardized engagement area system using the quadrant method is shown.

**Spot Reporting:** Each section, platoon, company and task force needs a clearly articulated method of massing direct fires. Tank commanders must be able to report enemy locations clearly and rapidly. One method, developed for the restricted terrain of Korea, employs the refined version of the quadrant method of direct fire control described above.<sup>29</sup> Using this engagement area system, a tank can relay critical battlefield information to every tank on his radio net, and subsequently higher nets.

A standard spot report using this system offers quick and discernible information for the entire platoon, company, or task force to mass direct fires:

*"CONTACT, TANK, ENGAGEMENT AREA KANSAS, EAST, ALPHA."*

This method allows follow on tanks to quickly identify the enemy, anticipate the direction and location of keyhole shots and mass direct fires. Mastering the EA system and spot reports by the tank commander and crew is a critical multiple-skill task which incorporates all we have discussed thus far.

**Call for Fire:** In a defile fight, suppression saves lives and buys the tank crew time. Accurate artillery or mortar fire, suppressing enemy keyhole positions, historically makes a 30 percent difference in the casualties of the attacking force in the defile fight. The lead tank attacking down a defile is key to the indirect fire suppression task. The tank commander should call for fire based on known enemy locations or anticipated keyhole positions. Once a target is identified and the TC calls for fire, he can adjust fire using the loader's PLGR, the Gunner's Laser Range Finder (LRF), and his map. With an accurate grid location and direction relayed to him by the loader [read off his PLGR], the TC lases to the target to determine the range. From these three known data points [location, direction, and range], he determines the enemy's location. The tank commander can then call for, or adjust, fire on the target.

**Camouflage and Light Discipline:** Camouflage and light discipline<sup>30</sup> are combat skills that pay high dividends when fighting in restricted terrain. The tank's crew must make all attempts to camouflage the vehicle to blend with the surroundings. A moving tank, well camouflaged, is harder to see than a tank that is not camouflaged and could provide a few minutes of indecision on the part of an ambusher. This is dramatically evident when one considers that there are no right angles in nature. The crew must actively distort the outline of the vehicle and its organic equipment to deny the enemy any possibility of detection. The entire vehicle should be camouflaged, causing the enemy to misinterpret the actual outline and appearance of the vehicle. Obscuring the right angles of the Abrams tank may be accomplished with shrubbery, bushes, branches and even sod during the spring and summer months. Blending the overall color of the vehicle with the surroundings is completed using snow, mud, off-colored burlap sandbags, or whitewash, depending on the season.

Most Threat armies are equipped with passive, light intensification sights and night vision devices. Light discipline, therefore, is an important survival task. Light discipline can be enforced by turning off all interior lights and taping over master power, driver's instrument panel and control panel lights. Covering the lights with tape will significantly reduce light emitted from the vehicle's periscopes, yet still allow for identification of crucial fire control, automotive, and vehicle status information.

### **Training for the Defile Fight**

To win in restricted terrain requires frequent training, as most tank crew skills are highly perishable.

To win in restricted terrain requires frequent training, as most tank crew skills are highly perishable. Personnel turbulence exacerbates the challenge of maintaining a high level of training on the functional capabilities of the tank. To train at a high frequency, most training will have to be conducted in the motor pool and in local training areas. The tank crew's mastery of technical and tactical subjects, the link to reaching the objective at the other side of the defile, will require study, drill, and repetition.

Training for the defile fight requires use of the basic and intermediate Tactical Tables, as found in FM 17-12-1, November 1986.<sup>31</sup> The Tactical Tables best suited for the defile fight, which should be completed concurrently with the gunnery training program, are listed in Table 1.

<u>Tactical Table</u>	<u>Task</u>
A	Negotiate a route using terrain for cover and concealment Navigate from one point to another point Analyze terrain using the Five Military Aspects of Terrain Detect a target and give crew acquisition report
B (B7)	React to Indirect Fire
(B8)	Evade Antitank Guided Missile (ATGM)
C (C1)	Engage Simultaneous Targets
(C3)	Engage OPFOR Tanks
(C4)	Engage OPFOR Security Element
(C5)	React to Ambush
(C6)	Engage Sniper
D (D1)	Coordinate Between Crews
(D2)	Execute Herringbone
E (E1)	Execute Action Drill
(E2)	Execute Contact Drill
(E3)	React to Indirect Fire
F (F1)	Engage Multiple Targets
(F2)	Engage Multiple Machine Gun Targets
(F3)	React to Ambush/Recon By Fire
(F4)	Engage Enemy Tank Platoon
(F5)	Engage Patrol and Sapper

**Table 1**

Tank gunnery tables train armor units to hit targets; tank tactical tables use gunnery skills and Multiple Integrated Laser Engagement Systems (MILES) to train armor units to fight on the real battlefield. In free-play force-on-force engagements, the tank crew learns to respond rapidly to OPFOR activity in order to destroy the opponent. Tactical tables train crews, sections (tank with wingman), and platoons at the basic (crew), intermediate (section/wingman), and advanced (platoon) levels of 24-hour combat operations. Engagements should be conducted both in the day and at night. The focus of this training should be to win the defile fight - teaching the critical crew tasks in the process.

A high frequency of training in local training areas is a requirement to master these tactical tables, so the availability of local training areas is a prerequisite. Every effort should be made to develop local training areas to their maximum potential. Training areas for the defile fight are often available because they represent the areas least suitable for "open terrain" operations by platoon-sized tank and mechanized units. In many cases, these defiles represent unwanted training land. This unwanted land, deemed incapable of armored maneuver on large scale, is exactly the kind of terrain that armored forces will have to move through and fight in on some of the potential battlefields of Korea or the Balkans.

The tactical tables in FM 17-12-1 w/C3 contain detailed information on most of the critical tasks listed previously. Units must develop specific task, conditions and standards to employ the PLGR, Route Chart, and engagement area system. Use of "jump radios," during these training events will allow for detailed information for after-action reviews (AARs) and will enhance learning.

The goal of this training is a tank crew that functions as a team, passes critical information quickly and

The goal of this training is a tank crew that functions as a team, passes critical information quickly and clearly, and controls the tank's battlespace. The flow of information from crewmember to crewmember is a combat multiplier and a major goal of this training. Crews must learn to anticipate the enemy, and engage and destroy the enemy before being ambushed. An enemy in an ambush position with a keyhole shot has a very limited field of view. His success involves firing before being seen. Increasing the situational awareness of the attacking tank crew is an integral part in gaining the 3-6 second advantage and getting the jump on the defender who is waiting in ambush.

## Conclusion

In restricted terrain, an armored force may be reduced to a frontage of one tank. During the Korean War, the U.S. Army found that "armor remained an indispensable part of ground combat, regardless of any limiting conditions under which it had to operate."<sup>32</sup> "Open terrain" tactics, successful in desert-like terrain, *will not work* in restrictive terrain. If armor leaders are sent to Bosnia, or fight again in the mountains of Korea, the ability of tank crews to fight through and penetrate defended defiles in restricted terrain will be decisive. This requires a different approach to tank commanding and crew responsibilities. The crew must work together to defeat the defender. Their collective skills are at a premium in restricted terrain. They must learn to obtain and express critical combat information within their tank and with adjacent tanks in new ways. The end result is creating an unmistakable advantage.

In Korea, we call this advantage the "3 - 6 second advantage."<sup>33</sup> If the tank crew is prepared, anticipates the defending threat, and aims his weapon systems at the anticipated keyhole position, the enemy can be suppressed or killed before he can identify, aim, and engage the attacking tank. This is a tough challenge, requiring thoughtful, focused training. Gaining the 3-6 second advantage over an enemy waiting in ambush takes an integrated crew effort to nullify the defender's terrain advantage.

To be ready for tomorrow's battlefields, U.S. Army armor crewmen must "grasp the potential capabilities and limitations of the space in which they operate."<sup>34</sup>

## Notes

<sup>1</sup>Department of the Army, *FM 100-5, Operations*, (Washington, D.C.: U.S. Government Printing Office, June 1994), p. 14-4.

<sup>2</sup>UCOFT stands for Unit Conduct of Fire Trainer and is the primary simulator for training Abrams tank crews. CALFEXes is an acronym that stands for Combined Arms Live-Fire Exercises. A CALFEX usually involves a company or higher formation conducting a live-fire engagement training exercise.

<sup>3</sup>The concepts of Alvin and Heidi Toffler, as found in their book *War and Anti-War*. First Wave occurred during the agricultural revolution, characterized by hand-to-hand combat; the Second Wave as the Industrial Revolution, represented by wars of mass destruction as in WWI and WWII; and the Third Wave, the ongoing information revolution, is knowledge-based warfare as evidenced in Operation Desert Storm.

<sup>4</sup>David A. Niedringhaus, "U.S. Army Armor in Limited War: Armor Employment Techniques in Korea and Vietnam," Masters Degree Thesis: Ohio State University: 1987, p. 27. "Initial assessments of armor performance and usefulness in Korea concluded that armor remained an indispensable part of ground combat, regardless of any limiting conditions under which it had to operate." p. 54.

<sup>5</sup>The three-to-six second advantage is defined by the author as the approximate time it takes for the enemy to identify you as the target, lay his weapon system on you, and fire. A basic rule of combat is that the first to fire is the first to kill.

<sup>6</sup>Kenneth Blanchard, et al., define high performing teams as teams with the following characteristics: Purpose, Empowerment, Relationships and Communications, Flexibility, Optimal Performance, Recognition and Appreciation and Morale. See *The One Minute Manager Builds High Performing*

Recognition and Appreciation and Morale. See *The One Minute Manager Builds High Performing Teams*, (New York: William Morrow and Company, 1990), p. 21.

<sup>7</sup>In addition, superb tank commanders must support the growth of three teams: the tank commander/platoon leader team; the platoon leader/platoon sergeant team; and the platoon leader/company commander team.

<sup>8</sup>The building blocks for all tank-related training are contained in three manuals: *TM 9-2350-264-10 (Technical Manual, M1A1 Abrams)*, *FM 17-12-1-1 (Tank Gunnery)*, and *FM 17-15 (Tank Platoon)*.

<sup>9</sup>Department of the Army, *FM 17-15, The Tank Platoon*, (U.S. Army Armor Center, ATTN: ATZK-DC, Fort Knox, Ky., 9 March 1993), p. 2-50.

<sup>10</sup>Department of the Army, *FM 17-12-1-1, Tank Gunnery (Abrams)*, (U.S. Army Armor Center, ATTN: ATZK-DC, Fort Knox, Ky., March 1993) pp. 6-2 through 6-5.

<sup>11</sup>*FM 17-12-1-1, p. 1-1.*

<sup>12</sup>*FM 17-12-1-1, p. 6-1.* This manual describes Target Acquisition as "a process that is a series of progressive and interdependent steps or actions by which a tank crew acquires enemy targets for destruction. It is a continuing requirement for all tank crewmembers, whether in the offense or defense, moving or stationary. The six steps in the target acquisition process are Crew Search, Detection, Location, Identification, Classification, and Confirmation."

<sup>13</sup>*FM 17-12-1-1, Chapter 6.* "Speed and accuracy of engagement depend on crew proficiency in target acquisition and gunnery; yet target acquisition is one of the hardest gunnery tasks to train effectively."

<sup>14</sup>*FM 17-12-1-1, Chapter 6,* describes in detail the Target Acquisition Process. The training process for target acquisition begins with an in-depth understanding of *FM 17-12-1-1, Chapter 6*, by all crewmembers. It must become second nature to the crew through repetitive training.

<sup>15</sup>Typically referred to as "IFFN," Identify Friend, Foe, Neutral.

<sup>16</sup>*FM 17-12-1-1, p. 9-10.* To conserve main gun ammunition, use tank-mounted machine guns in reconnaissance by fire to cause a hidden enemy to react. Fire a single burst (20 to 30 rounds with the M240 or 10 to 15 rounds with the caliber .50) while constantly observing for enemy movement, return fire, or the flash of rounds striking metal."

<sup>17</sup>The external antenna cable can be run from the inside of the turret to the external antenna easily following the power cable to the left or right Grenade Launcher. Some modification may be required with the use of some silicone to ensure a secure, sealed outlet to the external antenna. This procedure will not interfere with operation of the Smoke Grenade Launchers or the Over-Pressurization System.

<sup>18</sup>*FM 17-15, Oct. 87, pp. 2-38, 2-39.*

<sup>19</sup>Currently, there are approximately 35 countries that still utilize either the T54/55 or T62 as their Main Battle Tank.

<sup>20</sup>*FM 17-12-1-1, p. 2-7.* The ballistic computer provides only ballistic solutions for ranges between 200 and 4000 meters for main gun ammunition. No ballistic solution will be created for ranges between 4000 and 7990 meters (+/- 10m). Laser returns under 200 meters and over 8000 meters will be displayed as flashing zeros. When the gun select switch is set to COAX, the TC can use the Manual Range Battlesight button to select ranges down to 25 meters.

<sup>21</sup>*FM 17-12-1-1, p. 8-1.* Unit SOP will set battlecarry ranges based on the commander's analysis of mission, enemy, terrain, troops, and time (METT-T) available.

mission, enemy, terrain, troops, and time (METT-T) available.

<sup>22</sup>Department of the Army, *FT 120-D-2, Firing Tables*, (Washington, D.C.: U.S. Government Printing Office, 15 April 1994), pp. 42 and 43, (HEAT-MP-T, M830), the maximum ordinate, or highest part of the projectile trajectory to the target, is 1 meter above the gun/target line, 468 meters from the gun. *FM 17-12-1-1*, p. 7-1, evaluates the average size of Commonwealth of Independent States (CIS) manufactured or styled vehicles being 2.3 meters high, 3.4 meters wide, and 6.7 meters long. When a vehicle is in the defense, creating a substantially shorter target than 2.3 meters, the firing tank using battlesight gunnery techniques at 900 meters will miss the target completely if the vehicle is actually between 250 and 600 meters.

<sup>23</sup>*FT 120-D-2*, pp. 42 and 43, HEAT-MP-T, M830, Max. Ord. for 400 meters is 20 centimeters, 203 meters out from the gun.

<sup>24</sup>Department of the Army, *FT 7.62-A-2, Firing Tables*, (Washington, D.C.: U.S. Government Printing Office, 30 June 1973), p. 18. M80 Ball, battlesight range of 500 meters allows for a maximum ordinate of 1 meter at 300 meters. A battlesight range of 300 meters has a maximum ordinate of 0 meters (meaning less than 50 centimeters) out to 400 meters, which is 100 meters past the battlesight range.

<sup>25</sup>Kenneth Macksey, *Rommel: Battles and Campaigns*, (New York; Mayflower Books, 1979), p. 32.

<sup>26</sup>*FM 17-12-1-1* Chapter 13, Page 13-10 and *FM 17-12-1-2*, p. A-81. The tank commander must lay the main gun from the tank commander's override such that the target appears in the 3X sight within six seconds.

<sup>27</sup>*FM 17-12-1*, Coordinating Draft, Oct. 1990, p. 7-6.

<sup>28</sup>Department of the Army, *FM 101-5-1, Operational Terms and Symbols*, (Washington, D.C.: U.S. Government Printing Office, 21 October 1985), pp. 1-29 thru 1-30.

<sup>29</sup>The quadrant method of engagement areas is used by the Dragon Force, 2-72 Armor, in Korea for both defensive and offensive operations. In the offense, units attack into a series of sequential engagement areas. Each engagement area is defined by intervisibility lines (usually 1000 to 2000 meters long and as wide as the defile).

<sup>30</sup>Department of the Army, *FM 20-3, Camouflage*, (U.S. Army Engineer School, ATTN: ATSE-TDM-PP, Fort Leonard Wood, Missouri 65473, 14 Nov 90). This manual explains in detail the art of camouflage, its concepts, fundamentals, principles, and application through all phases of operation.

<sup>31</sup>Department of the Army, *FM 17-12-1 w/C3, Tank Gunnery, M1/M1A1 Abrams*, (Washington, D.C.: U.S. Government Printing Office, 3 Nov 86), Chapter 12, Tank Tactical Tables, were to be retained because they are to be republished in the next edition of *FM 17-15, Tank Platoon*, and are not currently published in *FM 17-12-1-1/2, Tank Gunnery*.

<sup>32</sup>Niedringhaus, p. 54.

<sup>33</sup>Three to six seconds is the time that an enemy requires to identify an attacker, aim, and engage the target.

<sup>34</sup>*FM 100-5*, p. 14-4.

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